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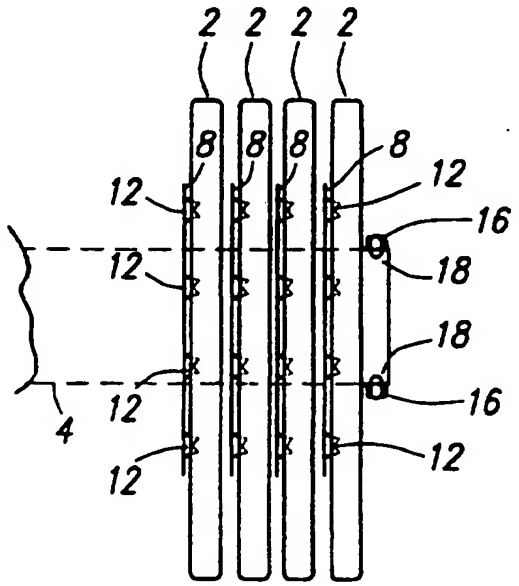
(54) Abrasive roller

(57) An abrasive roller for a floor cleaning machine comprises a plurality of abrasive discs 2 or tubes on a central body 4. The discs or tubes are held on the roller in a longitudinally compressed state and are also attached to the body 4 such that when in use on a cleaning machine they rotate with the body. They are attached by means of locking discs 8 having barbs 12 which project into an adjacent abrasive discs 2 and/or by gluing the abrasive discs 2 to the body 4.

FIG. 4



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

FIG. 1

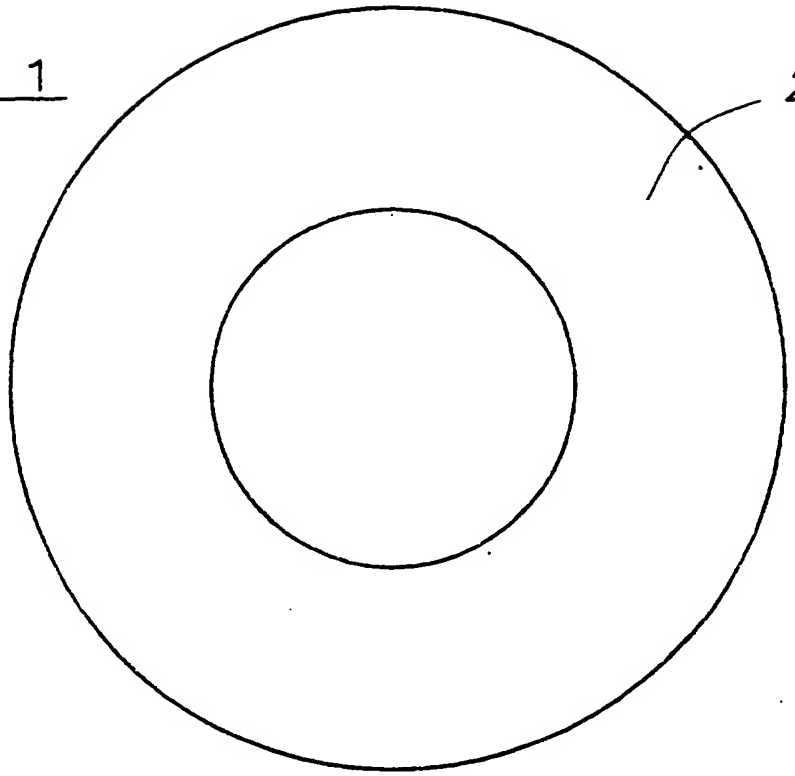


FIG. 2

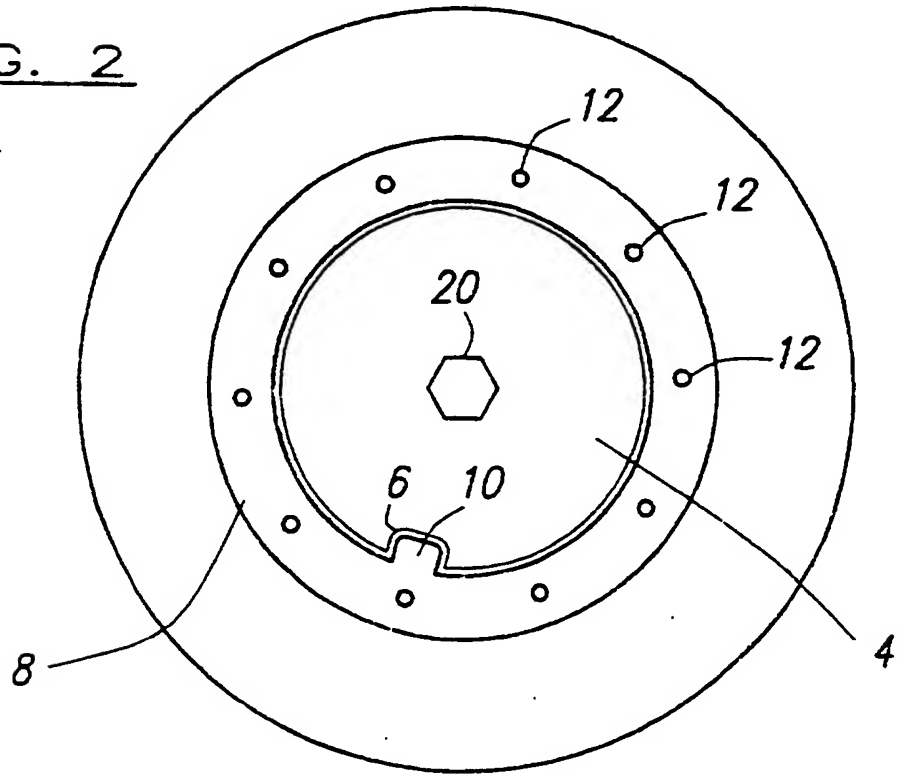


FIG. 3

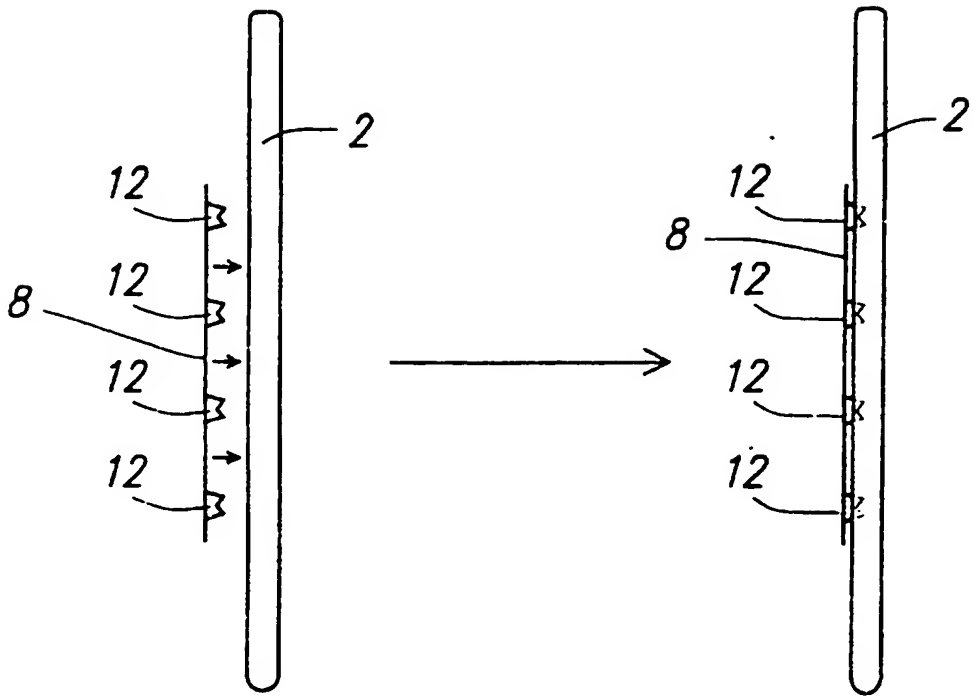


FIG. 4

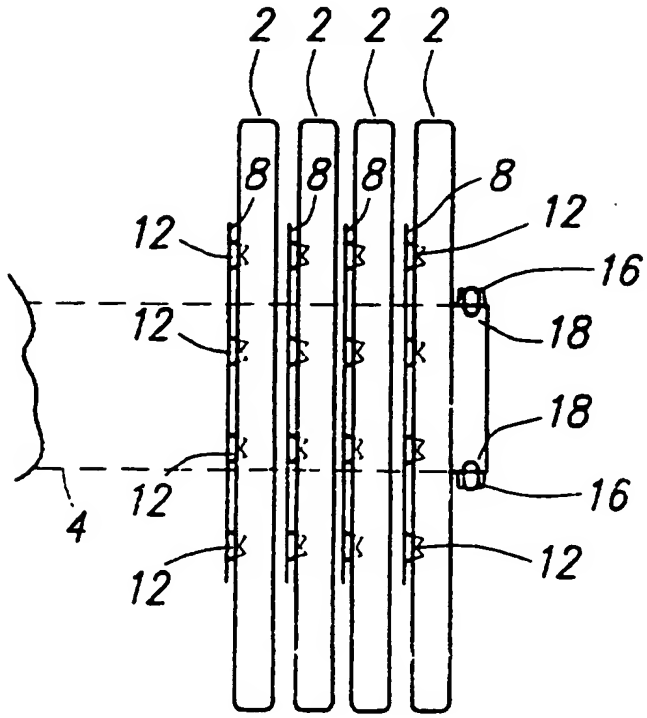


FIG. 5

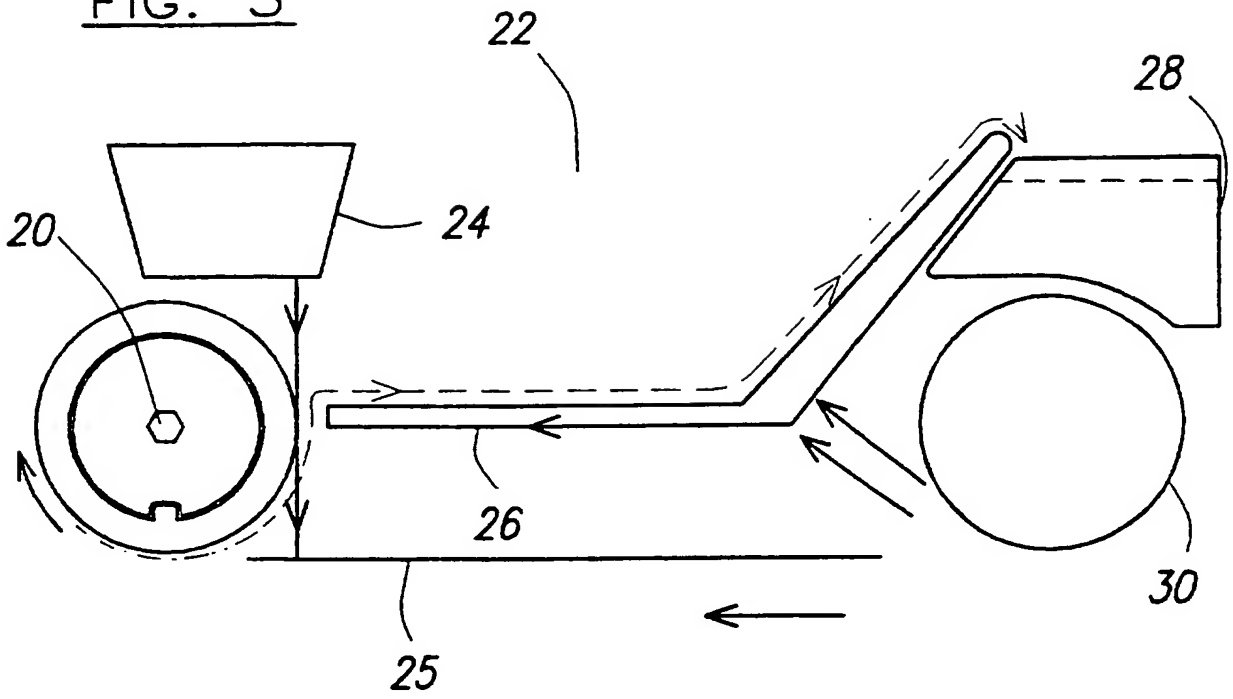
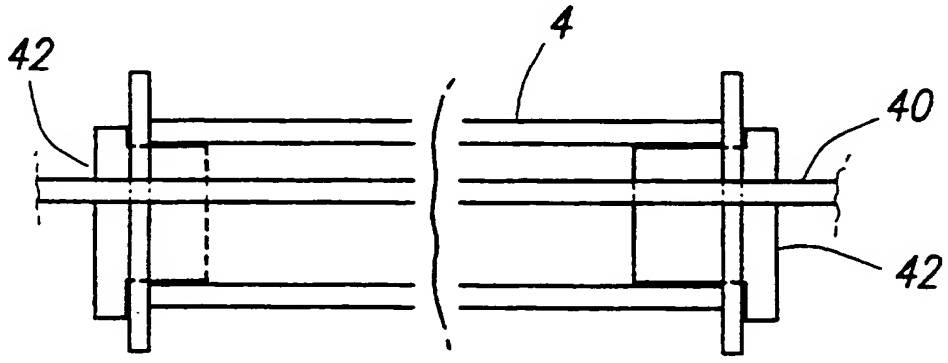


FIG. 6



ABRASIVE ROLLER

This invention relates to an abrasive roller and in particular to an abrasive roller for the cleaning of carpets and/or flooring.

There are a large number of apparatus which can be utilised to clean carpets and flooring. They range from the simple manual carpet sweeper and vacuum cleaner which are able to pick up dust particles from a carpet or floor to the industrial cleaners which are able to clean and wash carpets and clean, wash and, where necessary, polish flooring such as majolica tiles, wood, brick, marble, florentine brick relief tiles, gres, linoleum, rubber floor coverings and non-slip ultra floorings.

Industrial cleaning apparatus fall into two main categories firstly rotary cleaners which comprise machines having annular abrasive discs or rollers which are releasably attached to drive heads. The drive heads rotate such that the cleaning/washing surface of the discs/brushes are designed to remain in contact with the carpet/flooring being cleaned/washed at all times.

The discs used to clean/wash floors are generally made from a variety of abrasive materials of differing types and the brushes are generally made from nylon, which may be steel tipped or from any other appropriate material. The coarseness of the abrasive is usually indicate by a colour coding system which is standard to the industry. The discs/brushes are interchangable by an operator dependent on the job in hand. A buffing disc is also usually available so that once the cleaning stage has been completed a flooring requiring polish or the like may be coated and subsequently polished.

The second category is the roller type cleaners wherein brushes are attached to a cylindrical roller which is moved across the surface of the flooring being cleaned such that only a proportion of the cleaning surface of the brush is in contact with the surface of the flooring at any one time. Hence the pressure per square inch exerted on to a floor by a cylindrical roller is much greater than a disc.

This type of cleaning unit has the added advantage over the former in that it is able to pick small peices of rubbish such as cigarette ends and sweet wrappers and transfer them to a waste container whereas the former cleaners require an operator to carry out a pre-clean sweep to remove all such rubbish from the flooring being cleaned. Furthermore, the roller type cleaners may be adapted to clean using the disc type format by the fitting of a motion conversion unit to the drive.

One of the main problems in cleaning floors in places such as hospitals, sports centres and around the edge of swimming baths is the presence of marks caused usually by rubber materials and which are collectively referred to as black marks. These can be caused by a variety of means for example from the rubber soles of black soled training shoes, shoes, trolley tyres or from sports equipment such as rubber squash balls and footballs.

It is to be understood of course that the term black marks in this context is not restricted to marks coloured black and can relate to marks of this type in any colour but henceforth in this application marks of this type will be referred to, collectively, as black marks.

At present with the apparatus available black marks are extremely difficult to remove from flooring. It is thought

that one of the reasons for this with respect to the disc type cleaners is that when in use the discs are in fact arched so that the inner portions of a disc cleaning surface are not in contact with the flooring being cleaned.

It is standard practise in the cleaning business that the best way of removing black marks is by using the coarsest abrasive disc available and then edging. The term edging means putting the apparatus on its side so that the edge of the disc acts as the cleaning surface of the disc. This process has been able to remove black marks but the abrasive used has a tendancy to damage the flooring itself as well as removing the black marks and the cleaning apparatus are heavy and difficult to manouvre.

Nylon or steel tipped nylon brushes are utilised on the roller type cleaners but it has been found that these are relatively ineffective with respect to the removal of black marks.

Due to the structure of the rollers utilised in the second category of cleaners at present no equivalent to the abrasive discs has been produced by the industry. The abrasives generally used are made in sheets which are approximately 0.25 - 0.5 inches (0.615 - 1.25cm) thick. The coarseness of the abrasive used is indicated by a colour coding system which is standard throughout the industry.

This invention seeks to provide an abrasive roller type cleaning unit suitable for cleaning floors and particularly for the removal of marks caused by rubber and like substances (black marks) from flooring.

This invention provides an abrasive roller comprising a rotatable body and a plurality of substantially annular discs

of abrasive material, each disc provided in engagement with said body so as to rotate therewith.

In a preferred embodiment each disc is engaged with the body by way of a locking member. The locking member may take any appropriate form but preferably comprises an annular locking disc which is adapted to fit around the body and which has abrasive engaging barbs projecting from at least one side thereof. The outer diameter of the locking member is greater than the inner diameter of an annular abrasive disc but smaller than the outer diameter of the abrasive disc. The barbs are positioned on the locking disc such that when in use they will engage an adjacent abrasive disc.

The barbs on the locking disc may be arranged in any pattern such that either they all engage one adjacent abrasive disc or that some engage one adjacent abrasive disc and the remainder engage a second adjacent abrasive disc.

Also each annular locking disc comprises a means for engaging the body. This may, for example, comprise an inwardly facing projection which is adapted to engage a channel in the outer surface of the body such that the locking disc will only fit on the body when the projection is in the channel.

At each outermost edge of the body a locking means may be removably attached to the body to prevent longitudinal movement of the discs along the body. Preferably this locking means comprises a removable clip which is adapted to interconnect with an end of the body and in particular in a circumferential channel at the end of the body.

In the most preferred embodiment the abrasive and locking discs are compressed together on the body such that to the eye there would appear to be a tube of abrasive material

whereas in actual fact there is a plurality of alternate abrasive and locking discs fitted around the body. The abrasive and locking discs are retained in a compressed state by means of the clips at each end of the body.

The body may have a means of attachment to the drive means of a cleaning apparatus this may comprise for example a hollow centre adapted to engage a drive shaft of the cleaning apparatus thereby enabling the simple removal and replacement of the abrasive discs from the body once they have been worn through use.

An abrasive roller of this type may be adapted to be of any required length. The length of the abrasive roller being determined by the length of the body in use. Similarly the diameter of the abrasive roller is determined by the diameter of the body around which the annular discs are fitted and can be adapted as required.

In a further embodiment this invention also provides a body abrasive brush comprising a body unit and an annular tube of abrasive material adapted to fit around the body said tube of annular material being prevented from rotational movement upon rotation of the body by engagement with locking means on the body.

In this embodiment the locking means comprises barbs which project outwardly from the body body and which engage the tube of abrasive material.

The abrasive roller of the present invention can be utilised to remove black marks from flooring surfaces and thereby provides a much improved floor cleaning system in combination with the roller type apparatus. The rollers can be adapted to fit any type roller cleaning apparatus. It is possible that

on buying a new cleaning unit a rotatable body is provided with a large number of the abrasive discs and that the discs are replacable with discs available from the suppliers. The abrasive roller of the present invention may be provided in kit form such that the rotatable body and abrasive and locking discs can be obtained by a user as a kit of parts which can be interchanged with a brush type roller as described in the prior art.

A specific embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which:-

Fig.1 is a side view of a substantially annular abrasive disc

Fig. 2 is a side view of the disc as shown with a locking disc fitted thereto

Fig. 3 is an end view showing the locking disc free from and engaged to an annular abrasive disc

Fig.4 is an end view of a plurality of abrasive disc/locking disc combinations on a central body.

Fig. 5 shows a roller of the invention in use with a roller type cleaning apparatus.

Referring initially to Figs. 1 and 2, this shows a substantially annular disc of abrasive material 2. The discs are usually between 0.25 and 0.5 inches thick. The centre of the disc is sized to fit over a rotatable central body 4. Central body 4 has a channel 6 along its length. Locking discs 8 each have an inwardly facing projection 10 which is sized to fit into channel 6. If projection 10 is not aligned with channel 6 locking disc 8 will not fit onto body 4.

As can be seen in Figs. 2 and 3 the locking disc 8 is sized such that a plurality of barbs 12 engage the abrasive disc 2.

The method of attachment of the barbs 12 and abrasive disc 2 is shown in Fig. 3. Barbs 12 project outwardly from locking disc 8 and when compressed together with an abrasive disc 2 the barbs 12 engage the adjacent abrasive material.

The locking disc 8 is therefore able to engage the abrasive disc 2 by way of barbs 12 and body 4 by means of the insertion of projection 10 in channel 6. Hence when the locking disc is connected to both the body 4 and the abrasive disc 2, thereby ensuring that the abrasive discs rotate with the body.

Fig. 4 shows a plurality of abrasive discs on body 4 and engaged by way of barbs 12 to adjacent locking means 8.

In use the whole length of body 4 is surrounded by alternate abrasive discs 2 and locking discs 8. The two types of discs are compressed together and held in place by removable clips 16 at each end of body 8. Clips 16 fit into groves 18 at each end of body 4 to prevent longitudinal movements of the discs along the length of the body.

In use the body is attached to the drive rod of a cleaning machine by passing the rod through central passageway 20 of body 4.

Fig. 5 shows a roller type cleaning apparatus to which an abrasive roller of the present invention may be attached. The roller is fitted to the front end of the apparatus 22. Washing liquid is released from tank 24 and passes by way of the roller of the present invention to the floor 25.

As the apparatus is pushed along the abrasive roller rotates and cleans the floor. Rubbish and dirty washing liquid which is picked up by the roller is passed to conveyor belt 26 which conveys the rubbish and waste washing liquid to waste tank 28. Residual washing liquid is forced onto the conveyor by second roller 30. Second roller 30 may but does not necessarily have to be a roller of the type described in the present invention.

The use of an abrasive material as a roller enhances the prospects of removing black marks from a, for example, wooden floor or indeed any other type of floor and hence the use of a roller of the type described in the present invention is a significant improvement over the methods previously used in the prior art.

Claims

1) An abrasive roller comprising a rotatable body and one or more substantially annular discs and/or cylinders of abrasive material, each disc and/or cylinder being in engagement with said body so as to rotate therewith.

2) An abrasive roller in accordance with claim 1 wherein each disc is engaged with the body by way of a locking means.

3) A roller in accordance with claim 2 wherein the locking means comprises an annular locking disc which is adapted to fit around the body and which has abrasive engaging barbs projecting from at least one side thereof.

4) A roller in accordance with claim 3 wherein the barbs are positioned on the locking disc such that when in use they will engage an adjacent abrasive disc.

5) A roller in accordance with either of claims 3 or 4 wherein the outer diameter of the locking disc is greater than the inner diameter of an annular abrasive disc but smaller than the outer diameter of the abrasive disc, such that the outer portion of the abrasive disc projects outwardly from the locking disc when in use.

6)A roller in accordance with any of claims 3-5 wherein each annular locking disc comprises a means for engaging the body.

7) A roller in accordance with claim 6 wherein the engaging means comprises an inwardly facing projection or tongue which is adapted to engage a channel or groove in the outer surface of the body such that the locking disc will only fit on the body when the projection is in the channel.

8) A roller in accordance with any preceding claim wherein at each outermost edge of the body one or more locking members may be removably attached to the body to prevent longitudinal movement of the discs along the body.

9) A roller in accordance with claim 8 wherein each locking member comprises a removable clip and/or a cap which is/are adapted to interconnect with an end of the body and in particular in a circumferential channel at the end of the body and/or retain the discs/tubes in a compressed form on the body.

10) A roller in accordance with claim 1 or 2 wherein an adhesive may be used alone or in combination with the locking discs of claims 3-6 to adhere the abrasive discs to the roller body.

11) A roller in accordance with claim 10 wherein the adhesive used would preferably be water proof and chemically inert with respect to polishes cleaning fluids and the like used during the cleaning processes carried out by machines to which the roller are attached when in use.

12) A roller in accordance with claim 1 or 2 wherein one or more annular tubes or cylinders of abrasive material adapted to fit around the body.

13) A roller in accordance with claim 12 wherein , said tube(s) of annular material is/are retained on the roller by engagement with locking means on the body.

14) A roller in accordance with claim 13 wherein the locking means may comprise barbs which project outwardly from the body and which engage the tube of abrasive material and/or an adhesive

15) A roller in accordance with claim 14 wherein an end clip and/or disc and/or cap or the like is fitted to each end of the body to compress the abrasive tube(s) or cylinder(s).and prevent longitudinal movement thereof.

16) A roller in accordance with any preceding claim wherein once the abrasive discs or tubes have been worn down through use of the roller replacement discs or tubes may be placed on the body or alternatively the roller may be replaced as a unit.

17) A roller in accordance with any preceding claim which is in the form of a kit of parts.

18) A floor cleaning machine comprising one or more rollers in accordance with any preceding claim.

19) A roller for cleaning floors substantially as described with reference to the accompanying drawings.

The Patent Office

12

Application No: GB 9615709.4
Claims searched: 1-19

Examiner: Dave Butters
Date of search: 16 October 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B3D, A4F

Int Cl (Ed.6): B24D, B24B

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2186188 A	(ROTOWASH)	1,12,16,18
X	GB 2179571 A	(KORBER)	1,8,9,12, 16,17
X	GB1100854 A	(CHURCHILL)(See Figs 1-5)	1-5,10, 11,16
X	GB 0864760 A	(KLINGSPOR)	1,2,8, 16,17
X	GB 0562851 A	(CARBORUNDUM)(Particularly Fig 5)	1,2,8,10, 11,16
X	US 4570278 A	(KARTRIDG PAK)(See Col 9 lines 4-62)	1,2,10, 11,16

X Document indicating lack of novelty or inventive step
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